

Canada : Atomic Energy Control Board
" Special Committee on the operations of", 1949

1949

SECOND SESSION
HOUSE OF COMMONS

SPECIAL COMMITTEE

ON THE

OPERATIONS

OF THE

ATOMIC ENERGY
CONTROL BOARD

MINUTES OF PROCEEDINGS AND EVIDENCE *La Report*

No. 2

THURSDAY, NOVEMBER 10, 1949

WITNESS

Dr. C. J. Mackenzie, President, Atomic Energy Control Board

OTTAWA
EDMOND CLOUTIER, C.M.G., B.A., L.Ph.,
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
CONTROLLER OF STATIONERY
1949



MINUTES OF PROCEEDINGS

THURSDAY, November 10, 1949.

The Special Committee appointed to examine into the operations of the Atomic Energy Control Board, met at 10.30 a.m. The Chairman, Mr. McIlraith, presided.

Members present: Messrs. Bourget, Breithaupt, Brooks, Coldwell, Gibson (*Comox-Alberni*), Green, Low, McCusker, McIlraith, Murphy, Pinard, Winkler.

In attendance: Dr. C. J. Mackenzie, President, and Mr. G. M. Jarvis, Secretary, Atomic Energy Control Board.

Copies of the following documents were tabled for distribution to members of the Committee:

1. An Act relating to the Development and Control of Atomic Energy, Chap. 37, George VI, 1946, together with Statutory Orders and Regulations under the Act.
2. A group of papers presented before the sixty-first Annual General and Professional Meeting of The Engineering Institute of Canada, May 8, 1947, in Toronto, Ontario, and reprinted from The Engineering Journal under the title "Atomic Energy—A Canadian Symposium".
3. Chart showing the Chalk River Site.
4. Chart of the organization at Chalk River.

Dr. Mackenzie was recalled and further examined.

On motion of Mr. Low, seconded by Mr. Bourget,

Ordered,—That 500 copies in English and 200 copies in French of this day's Proceedings and Evidence be printed.

At 11.45 a.m. witness retired and the Committee went into private session.

The Committee adjourned to meet again, following the visit to Chalk River, at the call of the Chair.

R. ARSENAULT,
Clerk of the Committee.



MINUTES OF EVIDENCE

HOUSE OF COMMONS

November 10, 1949.

The Special Committee appointed to examine into the operations of the Atomic Energy Control Board met this day at 10.30 a.m. The Chairman, Mr. G. J. McIlraith, presided.

The CHAIRMAN: Gentlemen, we have a quorum. There are several preliminary matters to discuss. If it is agreeable to the committee, we would like to discontinue the taking of evidence a bit earlier today than we did the last day. Perhaps we could fix an hour now for discontinuing the main evidence. Would 11.30 be too early?

Mr. GREEN: What was that Mr. Chairman?

The CHAIRMAN: We would like to make the meeting a little shorter today than it was on Tuesday, and perhaps we could agree now as to the time we could stop.

Mr. BREITHAUP: Can we cover all that we want to cover by 11.30?

The CHAIRMAN: I think most of it.

Mr. COLDWELL: I think by 11.30 we will have all that we can take.

The CHAIRMAN: The second point is that at the end of that period, we have a few details about the Chalk River trip to consider. Perhaps we could clear the meeting at that point and finish off the details of the Chalk River trip. Is that agreeable?

Carried.

The CHAIRMAN: Before starting the evidence this morning, I have a copy in pamphlet form of the Act relating to the development and control of atomic energy, as well as a printed copy of the regulations. If it meets with your pleasure I shall be glad to file one for each member. In addition, I have here reprints from the Engineering Journal. It is "Atomic Energy—A Canadian Symposium". It is a copy of papers presented before the Sixty-First Annual General and Professional Meeting of the Engineering Institute of Canada held on May 8, 1947, in Toronto, Ontario. On page 7, there is an article by Mr. Tupper dealing with nuclear and pile theory, and at page 11 there is another article by Mr. Jackson dealing with the Chalk River project generally. I have a copy available for each member of the committee, and I think it will be found useful.

In addition to the material given to you, there is a chart for each member of the committee showing the Chalk River site. Perhaps I could distribute them now and they will be referred to later by Dr. Mackenzie. In addition, we have a chart of the organization, and it will be referred to in evidence in a few moments. Perhaps I could have them distributed now.

Perhaps we are ready now to hear Dr. Mackenzie continue the evidence that he was giving on Tuesday last.

Dr. C. J. Mackenzie, President of the Atomic Energy Control Board, recalled:

The WITNESS: Mr. Chairman and gentlemen, it might be helpful to refer for a few moments to the work of the Atomic Energy Control Board in its general aspects. The Act, on pages 3 and 4, outlines what the Board may do. Item 8(a) is the significant reference: to "undertake or cause to be undertaken researches and investigations with respect to atomic energy" and 8(b) "with the approval of the Governor in Council utilize, cause to be utilized and prepare for the utilization of atomic energy."

Section 9, "the Board may with the approval of the Governor in Council make regulations."

Now the Board itself is composed of five people at the present moment: The President of the Research Council is an ex-officio member and is the President of the Board; Mr. G. C. Bateman, mining consultant; Dr. Paul Gagnon, Director of the Department of Chemistry of Laval University; Mr. V. W. T. Scully, Deputy Minister of Taxation; Mr. W. J. Bennett, President and Managing Director of the Eldorado Mining and Refining Company.

There is a very small headquarters staff of eight people. The attempt has been made to keep the headquarters staff at a minimum and to utilize the facilities of the Research Council and other government departments. With regard to duties I might just say a word under five headings, and if you wish I have some notes here which we could have mimeographed and given to you later on to refresh your memory. Under Section 9, the furtherance of research was the major topic, and as I have told you the decision was taken to delegate to the National Research Council, as agents, the operation of the Chalk River plant, so that the Board as such has delegated, in detail, its responsibility for administration. I will not say any more about that because we will be discussing the Chalk River project when we go there. The second thing that we have to do is assist the universities which is authorized under one of these clauses, 8(i). I explained Tuesday, and I do not think it is necessary to repeat, the general plan of assisting research in the universities. The third thing which we do is distribute isotopes for research and for industrial purposes. The principles underlying the distribution are drafted by the Board, but the Chalk River organization carries out the details. Perhaps we could talk about isotopes at Chalk River where you could see them and talk directly with the gentlemen who really prepare and distribute them.

Next is the development of natural resources. I think you have a clear idea of this particularly as far as our responsibilities are concerned. Our Board has a limited responsibility in connection with the development of Canada's radioactive ore deposits and the reason for the present demand is, of course, obvious. We feel that the project is in its infancy from the industrial standpoint and that the demand in the future for industrial purposes will certainly grow. It is not very large at the moment. The chief use at the present moment is, unfortunately, for the bomb. Acting on the expressed opinion of the government that with proper security provisions the development of Canada's radioactive ores could best be carried out under the normal mining exploration conditions, the Board framed, as was its duty to do, the necessary regulations which would permit exploration and development under normal conditions. That is as far as the Board went. They have to issue these orders because under the Act they have the responsibility of controlling the movement of what are called "prescribed substances" which would be raw materials such as ore, fissile material and all materials which might be dangerous to the health of people handling them or to the security of the nation, so that our responsibility as a Board is limited to that extent. We have no responsibility for seeing to it that an enlarged program of development is undertaken. The reason, of course, is that

at the present moment the supply of material in Canada is more than adequate for our own needs. As you are probably aware, the major part of the uranium that is produced in Canada is exported to the United States under an agreement which our Board has nothing to do with.

On the other hand, as we have control and as there is only one purchaser we have exercised our authority in the matter of movement of the supplies; we had to make some arrangements so that the mining companies could dispose of their product once they got it. To that end an advisory committee of mining people was appointed to advise the Minister as to what steps should be taken, and the price that could be offered. I think you are familiar with these details. The government has offered to purchase through its crown company, the Eldorado Mining and Refining Company, uranium ores and concentrates of specified grade, normally 10 per cent by weight of uranium oxide, at a guaranteed minimum price of \$2.75 per pound of contained uranium oxide. As a result of the steps we have taken, there has been, as you know, a very great deal of activity in this field.

The Department of Mines and Resources has been very helpful to the industry, arranging for analyses, putting out a prospecting guide for prospectors and giving the type of advice that their geological service and metallurgical and ore dressing laboratories give to the industry.

In 1948, in nine months, there were 3,349 analyses made. That is, 3,349 samples were submitted by prospectors. And in the next year, 1949, that number has risen to 5,208.

It is, of course, fortunate that we have such a wide area for exploration; and, while our board has nothing to do with that, nevertheless, as individuals, in common with you, I think we feel some satisfaction in the belief that there will be extensive uranium deposits found in Canada.

By Mr. Gibson:

Q. And what percentage of those samples showed some radioactivity?—A. They would all show some; but it is like any other mining proposition, it is a matter of economy. This is confidential to the board, between the mining company and the analytical laboratory, which, I think, is the proper procedure. But I believe we have the right to know these things.

Mr. JARVIS: Yes, we have the right to know these things.

The WITNESS: We have tried to let it go in the ordinary way; we feel there should not be more restrictions put on than are absolutely necessary. That is the general philosophy of the board.

That is the picture, Gentlemen. Now, if there are any questions, I shall be glad to deal with them.

By Mr. Green:

Q. I do not understand just whom a person deals with, if he finds radioactive ore. What governmental body has the responsibility?—A. Eldorado. Eldorado is the purchasing agent.

Let us suppose that a prospector finds some ore. He would send it in for analysis to the Geological Survey. Then, the people who are supporting the effort look at the proposition, and if it appears to be favourable, they apply for a permit to set up diamond drilling and extension.

Mr. JARVIS: And they would report to the Geological Survey.

The WITNESS: Then, if they get to the point where they decide they will go on, having in mind the price they know they will get, they would go on in the normal way, with their mines. And when they got to the point where they had material for sale, they could sell it to the Eldorado Company, which acts as an agent.

By Mr. Green:

Q. They cannot sell it to any other purchaser?—A. No.

Q. And they cannot go on with their mining development unless they get a clearance from Eldorado?—A. No, from our Board. And let me say that the clearance would be given. There is no reason for it being held back. But we do have to know where this material is. The responsibility of our board is to know where everything is, to see that it gets into the proper channels.

Q. Is the prospecting done largely by individual prospectors working on their own, or is it done by employees of the large companies?—A. I could not answer that question. I would presume that it is being done in the normal way. I really do not know the answer.

By Mr. Gibson:

Q. You mean it is being done just like gold exploration?—A. I do not know; but as far as we can see it looks like the ordinary picture of mining gold.

By Mr. Green:

Q. I understand that a good deal of prospecting is done by the employees, let us say, of Consolidated?—A. Yes.

Q. I wondered if that was the picture with regard to radioactive ores, or whether prospecting was being done by individuals working on their own.—A. I could not give you any exact data on that.

By Mr. Coldwell:

Q. I think it is being done that way, because I know that in northern Saskatchewan there are a number of individual prospectors working. Would they get some help from the government?

By Mr. Low:

Q. A good many prospectors are working in various places in the Northwest Territory.—A. I think they would be following the same pattern as in the ordinary mining game.

By Mr. Murphy:

Q. Does the price warrant the same effort as you would find with the ordinary prospector?—A. I do not know what the miners get. Our Board has no responsibility for it at all. It is, unfortunately, a difficult position because there is only one buyer at the moment. We do hope, however, as the industrial side develops that situation won't remain very long. But it is a fact.

By Mr. Green:

Q. You would hope that uranium could be put on the market?

A. We would hope that industries would go up which would want uranium. At the present time nobody wants much. At least, there is not any great industrial demand for uranium.

By Mr. Coldwell:

Q. Isn't that one of the matters in which the Atomic Commission of the United Nations is very interested? Was it not the original plan to own all reserves?—A. At one time I think they wanted to own. Then they modified it slightly, to control.

Q. So it would be very difficult, at the moment, for industry to obtain any?—A. It might not if commercial power developed and it were found possible, under international control, to let a central power plant have it. Then

they would become buyers. But I could only speculate as to how the thing would be channelled. As I have said, at the moment, unfortunately, there is only one large use for it.

By Mr. Low:

Q. Does it not appear that the present price and conditions tend to discourage developing finds in areas which are fairly remote from transportation?—A. Well, I think that is the same picture with respect to gold or anything else.

Q. Well, I believe it is even more so in the case of uranium, from the fact that the price is \$2.75 a pound, and that is not terribly encouraging.—A. That is a general question of policy, which we do not decide.

By Mr. Coldwell:

Q. So far as the purchase is concerned, you are pretty well tied up by national expenditures.—A. We are.

By Mr. Low:

Q. Could you tell us if there would be any deterioration take place with respect to uranium once it is refined and put into storage?—A. I would say there is very little. I speak only from general knowledge, but I do not think it is significant. It has all been there for millions of years.

By Mr. Green:

Q. From the press we would be led to believe that uranium was in short supply all over the world, and that there was a great demand for it. But, apparently, that is not the picture.—A. I would not say that. I said the demand is for bombs.

Q. I beg your pardon?—A. The demand is for bombs.

Q. Would not Canada be wiser, then, to develop uranium to a greater extent?—A. That is a matter of government policy with which we have no responsibility.

By Mr. Coldwell:

Q. It is international policy.—A. All our responsibility is to see that the movement is known and controlled and that the material does not get into unauthorized hands, or create any health hazard. Those other matters are very interesting problems, undoubtedly, but I would suggest they are in the general political field, with which our board has no particular responsibility.

By Mr. Gibson:

Q. In what form do we export our uranium?—A. Oxide.

By Mr. Murphy:

Q. I think you mentioned isotope distribution for industrial purposes. Would you mind enlarging on that?—A. I have that matter put down as one of the headings. I would prefer to get through this in an orderly way, if I might. I would like to get through this mining business.

By Mr. Breithaupt:

Q. When you face a market with only one price and only one interest which is taking the product, do you think there is sufficient incentive to the prospector for him to go ahead and ply his trade as energetically as he would, perhaps, in

the case of some other mineral?—A. Of course, the only thing we can go on is the fact that we have had over five thousand samples sent in in 1949. I think that is quite good.

Q. That is good evidence?—A. Yes.

By Mr. Low:

Q. Would you mind enlarging on that. After the submission of those samples, how many claims, then, were actually developed? Could you give us any information on that?—A. We have no detailed knowledge of that at the moment.

Q. Relative to that, have you had any difficulty in securing all the uranium that you need for your work?—A. We have no problem, actually. The situation is that we are using only a moderate percentage of what Canada is producing. It is public knowledge that Canada is supplying material to the U.S. but as a board, we do not know the detailed quantities and price; we do not know anything about the internal working of Eldorado—but it has been published and stated that we are exporting uranium annually.

Q. Are there any other commercial producers, apart from Eldorado?—A. No, not in any quantity.

By Mr. McCusker:

Q. Are there any in the United States?—A. That is a matter on which our Board is not specially informed.

By Mr. Low:

Q. Is this a top secret: Is it the policy—whatever orders these things in Canada—to keep good reserves of uranium in store?—A. That, of course, is government policy. As I have mentioned, one person will say: why do we not export more? And another person will say: why do we not keep it? But that is not for us to decide at all.

Q. I know that; that is true. But what I wanted to know was: Is it your policy to keep a reserve?—A. We have a reserve. We have an annual production which is much greater than we are using, and that is a reserve, in one way.

Q. Yes, but one would have to subtract from that the amount we export to the United States; and I wonder if we are keeping in our own hands a sufficient reserve to meet any future needs?—A. We are sure that we can operate the Chalk River pile, which is our responsibility. Let me put it that way.

Q. Thank you.

A. I take it that what you are really asking me is: are we confident that we can keep on operating at Chalk River? And I think I could say to that, yes! But another thing, which is top secret, is the matter of the quantities of all this material, where it is, and how much. The Board has made it a point not to inquire beyond our own responsibility. The fewer secrets one has the better off one is.

By Mr. Green:

Q. I have always understood that the Atomic Energy Control Board kept a very close check on all mining for radioactive ores. But now you tell us that once the miner goes ahead, or the mining company goes ahead to develop the mine, then you people have no further interest in it.

A. No. We give an order which permits him to do the next phase of it, the diamond drilling. And we do that more for the purpose of keeping in touch with what is happening. Then, if he wishes to go on to the production stage, we would give the necessary permission; and before he started to sell it, he would have to have permission from the Board to do that.

By Mr. Low:

Q. What sort of reserves are maintained for the actual production phase?
A. We have not got any.

By Mr. McCusker:

Q. Would there be any possibility of supplying these concentrates to some other source without our knowledge?

A. The purpose of our control is to prevent that.

THE CHAIRMAN: Referring to Mr. Low's question, I take it that your answer was: We have not got any; and I take it that what you meant was, main producers.

THE WITNESS: Outside of Eldorado.

By Mr. Green:

Q. You mean, any other company which is producing uranium?
A. At the moment.

By Mr. McCusker:

Q. The concentrates are flown from the north?

A. Out of Eldorado.

Q. Suppose some other company was producing concentrates?

A. All that the board would be responsible for would be an audit, more or less as we have in our own plant. Some of this material can be very dangerous. So, with all these supplies, we have a very careful audit of everything that passes through our plant. It is very difficult, but we would do the same thing in mining operations.

By Mr. Green:

Q. Do you have any check on Eldorado?

A. No, that is a matter for the government, and we assume that the government is responsible for seeing that they would not divert material to an operation where it should not be diverted.

Mr. MURPHY: Is it possible, doctor, for any new company to produce for export without your knowledge?

The WITNESS: No.

Mr. GREEN: Where do the provincial Departments of Mines come into the picture? For example, in British Columbia the provincial Department of Mines is much closer to the mining picture than the federal department. I was just wondering what co-operation you have with the provincial departments?

Mr. JARVIS: The basis is one of co-operation. Any information that we think would be of interest in its field to other departments is interchanged, and we have made an arrangement by which as far as possible ordinary mining procedure is followed; that is in the physical field of safety, and that sort of thing, where we make provincial regulations applicable subject to the security regulations of the Board.

Mr. GREEN: You mean that a man could go in and stake a mine, a mine containing radioactive ores in the same way that he could stake say a silver, a zinc or a lead property?

Mr. JARVIS: Yes, exactly.

Mr. GREEN: Under the provincial laws?

Mr. JARVIS: Under provincial laws; but he has to report what he finds to the Board. Then he has to come to the Board when he wants to carry his operations beyond the prospecting stage; and under that order there are provisions

about keeping the Board informed, and where he may send his samples of ore for analysis, and provisions under which he may not move more than sample quantities except under a special permit of the Board.

Mr. GREEN: Then if he produces radioactive ore he would turn over to Eldorado?

The WITNESS: The only place that Eldorado would come into it would be as the marketing agency. He does not have to turn it over, but if he wants to get any money for it that is the only place where he can sell it. We do not say to him that he has got to do something.

Mr. GREEN: Can he concentrate it himself, smelt it himself?

The WITNESS: As long as he is authorized by the board to do it he can do that.

By Mr. Murphy:

Q. What worries me is this: what is there to prevent a developer, a miner or a prospector from doing some concentrating, making his own concentrates and shipping them to a foreign country?—A. He has to report any prospects.

Q. I know, but supposing he does not do that?—A. Then he is prosecuted just like any other offender.

Q. The point I am making is: is it not possible even in this country for a man, a prospector, to develop his own prospect, concentrate the product and ship it outside the country, let us say to Russia?—A. Well, it is almost impossible to do that. For instance, it is very difficult to erect and construct a large mining property without anybody in the country knowing anything about it. Then too, on top of that, how is he going to ship it; the railway would know about it and aircraft have regulations covering transport. I do not say it is theoretically impossible; but of all the crimes on earth one could attempt I think such a crime would be the most difficult to get by with without it being detected. That would be the responsibility of the Board. There is no question about that; it is the Board's responsibility.

Mr. GREEN: Is the ore of a type that a large quantity would require to be shipped?

The WITNESS: Yes.

Mr. GREEN: It is not like gold?

The WITNESS: The final product is very small but the start is very very large.

Mr. BREITHAUPt: If we are going to adjourn at 11:30 this morning would it not be wise to let the witness go on?

The CHAIRMAN: Just a moment, I think Mr. Green has another question.

Mr. GREEN: Yes. Mr. Chairman, there is one other question I would like to ask: is any of this ore being shipped to the United Kingdom?

The WITNESS: As I say, we do not know anything about the military end of it.

Mr. COLDWELL: The movement of this product is closely controlled.

The WITNESS: And it is also internationally controlled; but I would prefer not to answer that question.

Under the third item, that of responsibility—I think we have covered that.

Then, four, control of material and information—I think we have talked about that.

Liaison: Liaison with other organizations is very good. We maintain close liaison with the departments of government; we maintain liaison with the atomic energy projects in the United Kingdom and the United States—with the United States in a more limited way, as I mentioned the other day. Liaison with the public is a very difficult responsibility because it is hampered by our secrecy obligations, but we are trying to break that down.

The fifth item: is co-operation on international control, on that our machinery is set up. As you know, we haven't any responsibility for the negotiations

which are going on in the international field because that is the responsibility of government and departments. But we do provide experts for delegations, and officials; and, presumably, if some international control were set up the Atomic Energy Control Board would probably be the main agency of government handling it; but we carry no responsibility on that.

That is our picture, Mr. Chairman.

By Mr. Green:

Q. You mentioned liaison. I see in one of these documents you have given us you have a U.S.A. liaison officer at the same level with the vice president.—A. I just noticed that myself. I had not seen these drawings before this morning. I think that is just a matter of trying to show him somewhere.

An Hon. MEMBER: A matter of diplomacy.

The WITNESS: I agree with you.

By Mr. Green:

Q. How do you know what I was going to ask?—A. We wanted to show him to you. We wanted you to know that he is there.

Q. What I wanted to know is, is there any Canadian in a similar position in the States?—A. No, and the reason for the man being here was that when we started this project—it was cooperative, certainly—the degrees of cooperation of the various parties may have been different. Great Britain put in a staff, a sizeable staff; the Canadian government looked after financing, and put up a major part of the money; the United States put in certain things. They put in certain equipment and certain knowledge, a limited amount. The reason they put their man there was to facilitate matters. This liaison man is really up there to facilitate our getting what we are permitted to get from the United States.

I am not going to stress the remainder of the organization. As you can see the fundamental portion is in the middle of the chart here. We have a director, Dr. Lewis—a very distinguished scientist; we have the industrial facilities headed by Mr. Hatfield; we have three assistant directors who are in charge of large groups. You will meet all these people, talk to them, and probably the chart will mean a great deal more to you after your visit.

Mr. MCCUSKER: Would it be possible for us to have a chart giving the names of the individuals occupying the various positions?

The WITNESS: We can do that. We have a chart but I did not bring it today because I thought perhaps it was a little too much.

When you come to Chalk River we propose to give you a short background of each of those persons so you will know where they come from and what they are doing, and that should assist you when you are going around. I think it would be easier to distribute that information before we leave here.

The CHAIRMAN: Yes, perhaps on Tuesday morning.

The WITNESS: The plant site is composed of 10,000 acres of which only about one hundred acres are used. There are a hundred odd buildings. You have the chart in front of you showing those buildings. I will not stress them except to indicate to you that there are very interesting things there, particularly along this first horizontal road here at the top of the chart. You can see there the physics group, the chemistry group, and the pile group. There are a lot of other administrative buildings—about a hundred units on the site. Some of them are small.

By Mr. Gibson:

Q. Is that "water treatment" the heavy water plant?

A. No, that is ordinary water. The quality of the water was an important factor in selecting the site. Water is used for cooling so that the selection of

the water and the possibility of treating that water became one of the most important matters, much more important than the problem of obtaining ordinary drinking water.

Q. Do you get the heat for your buildings up there?

A. No. There, however, you have hit on a real industrial problem—how to get the heat out. It is low grade heat now and that is really the heart of the problem, from the industrial standpoint. With present materials we cannot raise the temperature in the pile to a degree that will make it an economical supply. We have got to do that however, before power becomes a practical thing.

Q. It would be too dangerous to get too great a heat at the present time.

A. The materials would not stand it. We have got to get up to very high temperatures.

Q. Superheated steam?

A. Yes, but now you see we do not dare go up to the boiling point of water because of the materials used. That whole field of research, of finding and developing materials which will have the proper physical properties and the proper nuclear properties, is one of the big things we are up against.

The village is a very interesting one. I want to say just a little about it. We propose that you should spend perhaps half an hour on Wednesday driving around the village looking at the hospital, the school facilities and so on. We would like you to have a bird's eye picture. We feel that it is one of the finest villages in the country. It is a very interesting place and an experiment in itself. There are 2,000 people there and we think we run it reasonably economically. We have a very nice school and a very fine group of children; there are a lot of them. There is a community hall and I think we have something like fifty clubs on the site. They, of course, are not all intellectual.

Q. We won't be out of our element there I hope?

A. We can satisfy any taste you have. There is the little theatre, boating, skiing, and the regattas up there are splendid. The people have built boats cooperatively during the winter time and they are all enthusiasts.

By Mr. McCusker:

Q. Has the school been running long enough to indicate how the pupils are and how the results compare with results in other schools? Are they superior?

A. I would guess that we would have a high I.Q. to start with. We have a very select group and the teachers and inspectors say that it is one of the very finest schools in Ontario.

Now that is a rough picture and I do not fancy, Mr. Chairman, that there is very much more I can say on this.

Mr. BREITHAUPt: What municipal government is there? Is there a mayor and a council? How are you running that phase?

The WITNESS: That is one of the matters which I would be very glad to have you look at. We have no municipal government.

Mr. GREEN: It is a company town?

The WITNESS: Yes, it is a company town. There are advantages and disadvantages and the thing we want is a sense of civic responsibility. To get that responsibility without the accompanying responsibility for the spending of money is a difficult thing. The school seems to run very well. We appointed a school board and the members take an interest, I suppose because they have children; they do very well. We have something that might be called a village council but when you take away the responsibility for the raising and spending of money you have a problem.

Mr. BREITHAUPt: Yes, it is a problem.

The WITNESS: I would be very glad to have you take an interest in it.

Mr. Low: Are there any policemen up there?

The WITNESS: Yes, but we do not use them very much. We have them at the plant.

Mr. COLDWELL: Do you have the Mounted Police?

The WITNESS: Not in a policing way. We use them for security. There is one officer on duty at the plant for security purposes. It is a very orderly place.

Mr. McCUSKER: No one owns their own property?

The WITNESS: No, and there is no unemployment. There are a lot of interesting things at the village. The commercial centres are limited and we have agreements with the concessionaires where we get a percentage of the "take." We have to run our own hospital services and it is a very fine hospital. We run the school, the recreation and commercial centres, and all the utilities.

I think I have given you an outline now. I have just tried to bring out the high points so that you will not be completely out of the picture when you make your visit.

By Mr. Green:

Q. Can you give us the connection between the Atomic Energy Control Board and the plant at Port Hope?—A. None at all. The plant at Port Hope is part of the Eldorado Company. The company consists of the mine plus the factory at Port Hope.

Q. You have no connection with it?—A. No.

Mr. McCUSKER: Among the employees at Chalk River you have many very young people. Are they allowed to bring in their dependent relatives or is that a problem?

The WITNESS: We have never faced that problem—whether a man brings in his mother-in-law—and I don't know whether we would object. What we do is to allot houses. We only have 440 houses, and we have a staff hotel, where this group will stay, with 400 rooms including those in the dormitories. We have to make the allocation of houses very carefully. A person is granted a house under certain conditions. If he wished to bring in some relatives naturally that raises a point but he could not get a house to do it. If it were a single family it would get a certain type of house; if it is a family with one child it would get another type of house; if it were a family with two children it would get another type of house and so on. If a man wants to accommodate his relatives and if the allocation has already been made on the basis of a man and his wife alone, they would live under very difficult conditions.

The CHAIRMAN: We have now come to our deadline but we have not gone as far as I had anticipated. The next two matters we proposed to deal with included a financial summary. It will be fairly short but I think we could leave it to another meeting.

The WITNESS: We might file it.

The CHAIRMAN: I would prefer to have it read.

Mr. COLDWELL: If it were filed we could read it and ask questions afterwards.

The CHAIRMAN: Perhaps we could go on for a few minutes more now and have the summary of the financial aspect?

The WITNESS: To give you some idea of the financial matters I will present them to you in periods. For the period of 1942 to 1946, everything was done through Munitions and Supply; we merely got F.E.'s under the War Measures Act or whatever authority it was, to run the laboratory. The National Research Council operated their laboratory in Montreal, and they operated the laboratories in Chalk River while the D.I.L. was building, so that our appropriations for

five years, from 1942 to 1946 inclusive, totalled \$2,907,558.36. The money spent on construction amounted to \$342,547.88, machinery \$29,095.19, and the salaries, plus what we call the necessary equipment that is not capitalized, \$2,536,005.29, so that when the Atomic Energy Control Board took over there had been that amount of money spent by the Research Council in Montreal and at the site. Now the only thing I know about the expenditures by D.I.L. is on this statement that I have. That was financed in the same way as all the other war projects. There were some banking arrangements I do not know much about. Of course these expenditures were audited in the usual manner. The total amount in 1944-1945: D.I.L. spent on construction at Chalk River, \$3,008,906.22, and in 1945-1946, \$14,843,132.41, in 1946-1947, the cost was \$7,808,277.72, of which \$2,532,580.99 was for operating. Then the Board took it over. In 1947-1948, there was spent \$5,389,130.03; in 1948-1949, \$6,476,714.40, and in 1949-1950, to September 30, 1949, \$2,825,265.51.

By Mr. Pinard:

Q. Is that all spent on construction?—A. No. Up to date, the total according to this sheet is \$40,351,426.29, of which \$27,268,100.11 was for construction, and \$13,083,326.18 was for operating.

By Mr. Green:

Q. That includes what the D.I.L. spent?—A. That includes everything. The breakdown is almost impossible to give you because there was a transition. The National Research Council ran the laboratories on one account until the time the Atomic Energy Control Board took over. The D.I.L. had a construction and an operating contract. When the Research Council took over the project on February 1, 1947, it did not take it completely over because D.I.L. had some construction to finish, so there was a period of nine to ten months during which we were looking after the new construction and current construction and D.I.L. was finishing up the old contracts. I think the most significant figures are really the over-all figures. You can say that at Chalk River there has been an expenditure of \$40,351,426.29 of which \$27,268,100.11 was on capital account. That is the significant thing.

By Mr. Green:

Q. That includes the work at Montreal University and at Chalk River?—A. That is Chalk River only—if the Montreal laboratory is included the total is \$43,258,984.65.

Q. That would not include the cost of producing uranium?—A. It does not have anything to do with Eldorado.

The CHAIRMAN: Perhaps I might clear a point here in the statement. I take it that \$43,000,000 figure deals with the expenditures on atomic energy development solely. There have been expenditures in addition for the Atomic Energy Control Board operations.

The WITNESS: But they are very small. I think the total is there but one would have to check it up. I may be wrong on that. Anyway the Atomic Energy Control Board figures run \$170,000 or something like that. Take 1948 to 1949, headquarters of atomic energy cost only \$31,000 a year out of \$6,000,000. That is a figure which must not be taken too seriously because the National Research Council does the essential part, but you can see that that figure does not really change the total figure at all. The big grants are to the universities. Those are the biggest expenditures, the ones I mentioned on Tuesday: \$150,000 a year is the grant made to the universities; \$30,000 roughly for the administration, which of course, is almost insignificant in comparison with the \$6,000,000 or \$7,000,000 we spent.

By Mr. McCusker:

Q. Is there any revenue or do you anticipate any?—A. Internally?

Q. I mean from the sale of isotopes?—A. There is a small revenue but it is insignificant. We feel that the isotope aspect is now one of research and we would not like to see research stopped anywhere through lack of isotopes; so that while we do charge for them, we try to make it possible to have the people get on with their research work.

I do not think you will ever get any great revenue out of isotopes supplied for research. But there is always the possibility, if we get to the point where commerce or industry uses these radio active things in mass quantities, in industrial processes that we might find a credit. But, at the present time, one of the difficulties is that you cannot permit these active particles to get into clothing, food, or anything which might react on the individual.

By Mr. McCusker:

Q. Are there not possibilities for use in agriculture?—A. For research. But I do not think you will make any money in agriculture in this way; although it might help out in the matter of knowledge, efficiency and effectiveness of agriculture. That is one of the fertile fields, but I do not think there is any money in it. I do not think we would ever make money out of this, anymore than we would make money out of universities, and hospitals.

By Mr. Green:

Q. In effect, it is just one large research plant.—A. That is perfectly true.

By Mr. Murphy:

Q. In your capitalization structure, have you separated the equipment and machinery from the buildings?—A. Yes, we have all that information, but I have not got the totals with me. I may say that the construction of the buildings would be much larger than the machinery. I think it is very difficult to say whether a pile is a machine or a building.

Q. Could you tell us if, in the course, of your research, some of the equipment which you originally obtained would be now out of date?—A. Nobody can say it is out of date but ourselves, because we are the only ones in that field. We certainly know how to build a better pile, and the next one we build will be modified. Undoubtedly, as we went along, we found certain things which we would have to correct. It has just been one long series of difficulties.

Sometimes you will find that the precautionary measures you have taken were not necessary and that you could get away with less precaution; while in other cases, you will find that the thing was a failure and you have got to do something better. But that is typical of research and development, and that is the field we are in. What might very well come out of this, as a secondary matter, is that some of the things which are developed in this atomic energy plant might find very great use in industry.

The CHAIRMAN: I think, perhaps, if the committee will agree, we will terminate our evidence for this morning at this point.

—The committee went into private session.

